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BiSON Birmingham Solar-Oscillations Network

TECHNICAL REPORT NO. 376

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This technical report series is published by:

THE UNIVERSITY OF BIRMINGHAM

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Abstract

The aft cell-oven, magnet, and detectors were removed from spectrometer-K ("Klaus") and returned to Birmingham. The tower was shutdown over the winter and will reopen in spring 2016.

1 Introduction

Steven Hale visited Mount Wilson from 2015 December 8 to 13. The last visit to Mount Wilson was a year and a half ago, in 2014 April [1]. The purpose of this visit was to recover some spare components, specifically including magnets and scattering detectors, for use back in Birmingham.

2 Aft Oven-Assembly

Both the forward and aft oven assemblies were removed. This was done by loosening the two forward and aft bulkheads allowing the ovens to be released. It is important that the bulkheads are replaced in the same position since this defines the lens positions and focal planes of the spectrometer. Providing the centre bulkhead shared between the two ovens is not moved, it is simple to ensure the ovens and outer bulkheads go back in the correct position.

The aft oven assembly, magnets, and two detectors were permanently removed from the spectrometer and returned to Birmingham. This has not resulted in any data loss from this spectrometer, since there has not been a potassium vapour cell in the aft position as of 2005 September [2]. The position of the aft-oven bulkhead was marked on the chassis simply with a pen, allowing the correct placement to be achieved even without the oven installed.

3 Forward Oven-Assembly

On a previous visit in 2005 September [2] one of the four scattering detectors was returned to Birmingham for repair due to high noise levels. The photo-diode was replaced, and the detector re-installed in 2007 August [3]. However, there was some confusion regarding where the detector was originally installed, and so it was simply installed in the vacant aft-top position. The problem is exacerbated due to one detector erroneously having the wrong gender connector, limiting the positions in which it can be installed.

Since on this visit all four detectors were removed and inspected, it was possible to determine with reasonable confidence where each detector was originally installed. The two original forward-detectors have yellow heat-shrink on the power/temperature cable, and 100 MΩ gain resistors. The two original aft-detectors have black heat-shrink on the power/temperature cable, and smaller 47 MΩ gain resistors. The forward-detectors have three screws for attaching the optical faceplate, whilst the aft-detectors have four. Due to the differing mechanical construction, the optical faceplates must remain in their original positions, and only the detector housings should be moved.

Two detectors were selected to be installed in the forward position, and two were returned to Birmingham. One of the original forward-detectors was determined to have broken temperature control, and so the two remaining in service are one forward-detector and one aft-detector. This meant that one detector produced significantly fewer counts due to the lower gain resistor. The 100 MΩ resistor from the broken forward-detector was removed and used as a replacement. This did increase the counts but not quite to the same level as expected, and this should be inspected on the next site visit. The temperature control for the two detectors was set to maintain just above 20°C, and the dark counts adjusted using the controls on the back of Klaus to maintain approximately 1000 counts. Due to the connector gender-problem with the one detector, the channels names for the temperature control system are not correct and care should be taken when adjusting any settings.

4 Alignment and Testing

The spectrometer was aligned by removing the interference filter and observing the path of the beam through all the optical elements. This technique has been shown previously to be satisfactory [1], and that more sophisticated techniques are not required. Only one day of clear weather was available on this short visit, but it was enough to confirm alignment and test the operation of all the remaining components. The spectrometer was confirmed to be operating normally following the work.

5 Tower Shutdown

At the end of this visit, the tower was shutdown for the winter on 2015 December 13. Where possible, hardware was isolated from the mains power supply to limit any potential damage due to storm activity over the winter. The tower will remain closed until spring 2016.

References

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